

A SECOND SPECIES OF *HUNNEMANNIA* (PAPAVERACEAE) AND SYNOPSIS OF THE GENUS

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ABSTRACT

A second species of the previously monotypic genus *Hunnemannia* is described: *H. hintóniorum*. The new species apparently is a rare gypsophile restricted to a small area of Nuevo León, México. *Hunnemannia fumariifolia* is much more common and ranges from Nuevo León and Coahuila south to Oaxaca. A synopsis of the genus is presented, including a species key and distribution map. *Hunnemannia* apparently is the sister taxon of *Eschscholzia*, which has its native range primarily restricted to California and areas immediately adjacent to it.

KEY WORDS: *Hunnemannia*, Papaveraceae, México

Hunnemannia Sweet has been recognized as a monotypic genus endemic to eastern México, but it has never been the subject of a focused taxonomic discussion. The discovery of a second species of the genus has prompted the following review and taxonomic synopsis.

A close relationship among the genera *Hunnemannia* (1 species until now), *Eschscholzia* Cham. (ca. 13 species, primarily in California and immediately adjacent areas), and *Dendromecon* Benth. (ca. 2 species, restricted to California and Baja California) has long been recognized. *Hunnemannia fumariifolia* has been included within *Eschscholzia*, but Heynhold's nomenclatural transfer was no more than an entry in a list, and Baillon (1874) provided only superficial comments in justification of their merger. All subsequent botanists have maintained them as separate genera. Greene (1905b) proposed the segregation of two species of *Eschscholzia* as *Petromecon* E. Greene, adding a fourth genus to the group, but contemporary botanists have not accepted this segregate, referring both of Greene's species of *Petromecon* to *E. palmeri* Rose.

Reichenbach (1841) recognized *Eschscholzia*, *Hunnemannia*, and *Dendromecon* as a subgroup of the Chelidoniaeae, the Eschscholzieae Reichenb. (or the orthographic variant "Eschscholtzieae" - Chamisso's original spelling of the genus

was "*Eschscholzia*," although the name commemorated J.F. Eschscholtz). Reichenbach's applications of suffixes in subfamilial taxonomy were not consistent with modern usage, and his category of Eschscholzieae is approximately equivalent to a subtribe. Bentham & Hooker (1862) recognized the same three genera as the tribe Hunnemannieae Benth. (the rank explicitly stated) within the Papaveraceae (or their subfamily Papavereae of the Papaveraceae). In nearly the same restricted sense (including the same three genera, but also recognizing the segregate *Petromecon*), Fedde (1936) adopted the tribal designation Eschscholzieae (Reichenb.) Fedde (a new combination, as Fedde explicitly regarded the group as a tribe - an illegitimate name in any case, in view of Bentham's earlier Hunnemannieae). Most recently, Ernst (1962) recognized the three genera as subfamily Eschscholzioidae Ernst of the Papaveraceae. Within the family, plants of the Eschscholzioidae are distinguished by their production of stems, leaves, and floral organs completely glabrous or sparsely invested with unicellular hairs, watery sap, two sepals and four (to six or eight in *Eschscholzia*) yellow petals, bivalved fruits with ten, distinctly raised, longitudinal nerves and with elastically and acropetally dehiscent valves, and polycolpate pollen (Ernst 1962).

A chromosome number of $n=28$ (28 pairs) has been reported for *Hunnemannia fumariifolia* (Sugiura 1940; Ernst 1959; erroneously reported as $2n=28$ by Federov 1969), suggesting that it is an octoploid based on $x=7$. The base chromosome number of *Eschscholzia* apparently is $x=6$ (Lewis & Snow 1951; Ernst 1958, 1959). Only a single taxon, *E. glyptosperma* E. Greene, has a diploid number of $n=7$, but it has been hypothesized by Clark (in Clark & Jernstedt 1978) to be an aneuploid derivative of *E. parishii* E. Greene with $n=6$. Diploids through hexaploids are known in *Eschscholzia*; two other species have aneuploid numbers, these apparently representing the loss of a single chromosome pair from tetraploid and hexaploid levels of $x=6$ (Ernst 1958). Two chromosome counts for *Dendromecon* show it to have 28 pairs of chromosomes (Ernst 1958). Both $x=6$ and $x=7$, as well as $n=28$, are found elsewhere in the family, outside of the Eschscholzioidae.

Hunnemannia and *Eschscholzia* are most closely similar in morphology to each other within the subfamily Eschscholzioidae. Both are herbs with thrice ternately dissected leaves, stigmas with 4-8 lobes, and nonarillate seeds. *Dendromecon*, in contrast, is a woody shrub that produces simple, entire leaves, stigmas with two, short, thick, and erect lobes, and arillate seeds. An unequivocal hypothesis of phylogenetic relationship among these three genera, however, is more difficult to construct, as the similarities between *Hunnemannia* and *Eschscholzia* can be interpreted as plesiomorphic. Among other subfamilies of Papaveraceae (Ernst 1962), some genera of the Chelidonioideae Ernst appear to be most similar to the Eschscholzioidae.

While *Eschscholzia* is at least superficially similar to *Hunnemannia*, the former differs in its (1) perigynous flowers (the perianth and stamens borne

on the rim of the hypanthiumlike expansion of the receptacle), (2) "calyptrate" calyx, the sepals connate and forming a conical hood (shaped like a "candle snuffer") easily pushed off by the expanding petals, (3) stigmas with 4-8 linear, erect to spreading lobes, and (4) base chromosome number of $x=6$. Recent studies by Clark & Jernstedt (1978) of seed morphology have provided additional evidence that the two should be maintained as distinct genera. The seeds of *Hunnemannia* are larger, and the outer seed coat is without stomates and produces only weakly developed, irregularly arranged, and discontinuous ridges (also see Gunn & Seldin 1976).

Hunnemannia Sweet, *Brit. Fl. Gard.* 3:54, t. 276. 1828. TYPE SPECIES:
Hunnemannia fumariifolia Sweet (see below).

Perennial herbs from a strongly developed, woody taproot (in *Hunnemannia fumariifolia*), completely glabrous, without spines. Leaves alternate, not clasping, (2-)3 ternately dissected into narrow segments. Flowers solitary on long, naked pedicels, without an expanded, receptacular rim; sepals 2, greenish, apiculate, separate and fugaceous; petals 4 in 2 series, yellow, obovate; stamens numerous; ovary bicarpellate, unilocular, with 2 parietal placentas; stigma sessile, with 4 lobes united into a distinctly peltate structure, the inner portions densely invested with glandular appearing papillae. Fruits (in *H. fumariifolia*) linear and more or less terete, 2 valved, dehiscent acropetally and apparently explosively, the valves persistently attached at the style; seeds (in *H. fumariifolia*) numerous, more or less globose, the outer surface with numerous, minute, irregularly arranged and discontinuous ridges, without stomates. Base chromosome number, apparently $x=7$.

The genus was named for John Hunnemann (ca. 1760-1839), a London bookseller who acted as agent for the sale of herbarium specimens and introduced new plants for cultivation (Desmond 1977). In Sweet's own words: "We have named it in compliment to our friend, Mr. John Hunnemann, who, through his numerous correspondents in various countries, has been the means of introducing a greater number of plants to our collections than almost any other individual ..." *Hunnemannia* is known in the horticultural trade as the "giant yellow tulip poppy" or the "Mexican tulip-poppy."

KEY TO THE SPECIES

1. Stems 4-10 dm tall, with 1-4 branches, densely leafy; leaves thin, with the venation easily visible but not at all raised, the ultimate segments 2-5 mm wide, mostly 10-30 mm long. *H. fumariifolia*

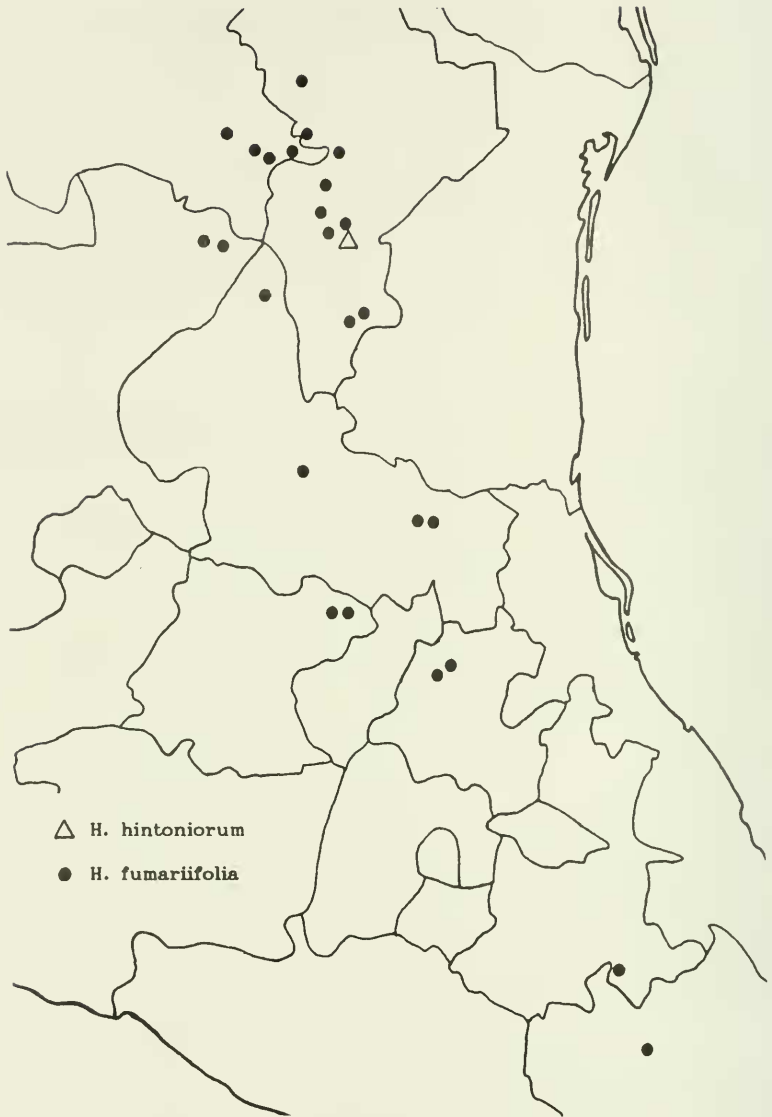
1. Stems 2-3 dm tall, unbranched, scapose, with a few minute bracts near the base, the leaves all basal; leaves thick and somewhat fleshy, with only the raised midvein perceptible, the ultimate segments 0.6-1.2 mm wide, mostly 3-6 mm long. *H. hintoniorum*

Hunnemannia fumariifolia Sweet, *Brit. Fl. Gard.* 3:54, t. 276. 1828. TYPE: MEXICO. Sweet noted that "Our drawing of this beautiful plant was taken in July last, from fine specimens received from the choice collection of Robert Barclay, Esq. of Bury Hill, where it was raised last year from seed received from Mexico." The drawing is detailed and diagnostic and may be taken as the type. *Eschscholzia fumariifolia* (Sweet) Heynh., *Nom. Bot. Hort.* 1:316. 1840.

Stems 4-10 dm tall, usually basally herbaceous, erect to ascending, with 1-4 branches originating above midstem; stems and leaves usually distinctly glaucous. Leaves thin, with venation prominently visible but not at all raised, densely crowded along the stem, little reduced in size upwards, 5-14 cm long with petioles (1-)2-6 cm long, the ultimate segments mostly 10-30 mm long and 2-5 mm wide. Flowers on naked pedicels (5-)10-15 cm long; sepals striate, 18-21 mm long; petals obovate to widely obovate or widely depressed obovate, (15-)25-45 mm long, (20-)25-45 mm wide; anther filaments 2-6 mm long, thecae 2-6 mm long; ovary 6-12 mm long, the stigma 2-4 mm wide. Fruit 9-15 cm long, bearing ca. 60-80 seeds. Two unique alkaloids have been isolated from *Hunnemannia fumariifolia* (Manske *et al.* 1942).

Coahuila, Nuevo León, San Luis Potosí, Hidalgo, Puebla, and Oaxaca in México (Map 1), also reported as an occasional "escape" in California (Abrams 1944; Munz & Keck 1959) and the island of Maui (Hawaii) from an introduction in 1920 (Wagner *et al.* 1990); mostly on open slopes or flats, also streambeds, abandoned fields, and roadsides, in matorral with *Larrea*, *Yucca*, *Agave*, *Acacia*, *Prosopis*, and other shrubs, to pine woodlands with juniper, oak, and fir, over limestone and gypsum, 750-2300(-2700) m; essentially flowering all year with available moisture. Bailey (1950, p. 1615) reported that "seed sown early in May in the East [United States] give bloom in July, and plants are covered with large yellow flowers until hard frost."

Hunnemannia fumariifolia is represented by many collections over a relatively wide geographic range, and there is little variation in its habit and distinctive morphological features. This apparently is in strong contrast to the variability in the two other genera of the Eschscholzioideae — *Eschscholzia*, where more than 100 species have been recognized by several botanists (Greene 1905a; Fedde 1909), and *Dendromecon*, where seventeen species were recognized by Greene (1905c).



Map 1. Distribution of *Hunnemannia fumariifolia* and *H. hintoniorum*.

Hunnemannia hintoniorum Nesom, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Galeana, near Río de San José, gypsum hillside, 1465 m, 24 Mar 1992, *Hinton et al.* 21876 (HOLOTYPE: TEX).

Differt a *Hunnemannia fumariifolia* Sweet caulibus scaposis brevioribusque et foliis omnino basalibus crassisque segmentis ultimis aliquantum brevioribus angustioribusque.

Stems 2-3 dm tall, several basally woody and ascending caudex branches arising from the root and forming a bowl shaped cluster, root not seen. Leaves strictly basal, originating in a dense cluster at the apex of the caudex branches, fleshy, not glaucous, 3-5 cm long with petioles 1.5-2.5 mm long, the ultimate segments mostly 3-6 mm long and 0.6-1.2 mm wide, with a raised, subepidermal midvein, the other venation not visible. Lower portion of the scape sometimes with 1-2 linear bracts 3-10 mm long. Sepals not seen; petals widely obovate, ca. 20 mm wide, ca. 25 mm long; anther filaments ca. 4 mm long, thecae 4.0-4.5 mm long; ovary 7 mm long, the stigma 2 mm wide. Fruits and seeds not seen. Map 1.

The new species differs from *Hunnemannia fumariifolia* in its shorter, scapose, and unbranched stems and its leaves completely restricted to a basal cluster, the blades thicker with shorter and narrower ultimate segments and a raised midvein (any other venation not visible). It is certainly a rare and narrowly endemic species, and it is clearly distinct from its sister species. Although the fruits of *H. hintoniorum* are not yet known, the peltate stigma and distinctly ribbed ovary are identical to those of *H. fumariifolia*.

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